Amendment to the Drawings:

Please replace drawing sheet with Figure 4 with amended drawing sheet with Figure 4 attached herewith. Reference numeral 270 is changed to 270'.

Attachment: Replacement Sheet
Annotated Marked-Up Drawings

REMARKS/ARGUMENTS

The drawings have been objected as failing to comply with 37 CFR 1.84 (p)(5). The specification pages 9-11 and the drawing sheet with Figure 4 have been amended in view of the Examiner's objection. In addition, page 16 of the specification has also been amended to correct an inadvertent typographical error.

Claims 1-4 and 6-56 are pending. In view of the Examiner's comments and with a view to better defining the invention, claims 1, 2, 13, 14, 20, 27, 28, 33, 34, 35, 43, 49, 53 and 54 have been amended.

Applicant notes with appreciation the allowance of claims 21-26, 29-32, 44-48, 50-52, 55 and 56 and the allowability of claims 8, 9, 10-12, 18 and 39-41 if rewritten in independent form and to overcome any indefinite objections. However, Applicant has not rewritten claims 8, 9, 10-12, 18 and 39-41 in independent form in view of arguments with respect to the base claims set forth below.

The claims have been amended with a view of better defining the invention having regard to the Examiner's comments. Consequently, the Examiner is respectfully requested to consider the amended claims in view of the following comments.

Without limitation of the claims, the disclosed embodiments pertain to a novel methodology and apparatus for compensating for phase errors in FDM systems, where the phase errors are associated with clock offsets between the receiver and the transmitter. A first compensation deals with the carrier frequency offset. The sampling clock offset is also addressed by preferred embodiments. Compensation of the phase offset associated with carrier frequency offset is achieved by rotating pilot and data sub-carriers by an accumulated phase offset and updating the accumulated phase offset based on residual phase offsets of the pilot sub-carriers.

Applicant's specific remarks in response to the Examiner's objections and rejections of specific claims are presented below and reconsideration is respectfully requested.

Claim 27

Claim 27 has been amended to depend on claim 21 in view of the Examiner's objection to this claim.

Rejection of Claims 20, 28, 33, 43, 49 and 53 under 35 U.S.C. 112

Claims 20, 28, 33, 43, 49 and 53 stand rejected under 35 U.S.C. 112 as being indefinite for failing to comply with the enablement requirement with respect to combining the recited standards. For expediting the prosecution of these claims and reserving the right to further pursue the removed subject matter in a continuing application or otherwise, Applicant has amended these claims by removing the limitation " and combinations thereof".

Rejection of Claims 2, 5, 9, 13, 14, 20, 28, 33, 35, 43 49 and 53 under 35 U.S.C. 112

Claims 2, 5, 9, 13, 14, 20, 28, 33, 35, 43 49 and 53 stand rejected under 35 U.S.C. 102(b) as being indefinite for having insufficient antecedent basis for their limitations.

In claims 2, 13 and 35, the term "the negative value" has been replaced by the term "an inverse" to indicate an opposite signed value, with support on page 13, lines 5-8 of the specification.

In amended claim 14, the limitation "initial step" has been replaced with an explicit recitation of the order of occurrence of steps. Moreover, the term "selectively" has been removed.

With regards to the Examiner's objections to the lack of antecedent basis for the term "the magnitude" in claim 9, the claim is amended by deleting "the" at line 3.

With respect to the Examiner's objections for lack of sufficient antecedent basis for the term "the group" in claims 20, 28, 33, 43, 49 and 53, Applicant respectfully indicates that the term "the group" is used to recite a Markush group, an acceptable expression according MPEP 2173.05(h).

Rejection of Claims 1-4, 7, 13, 19, 27, 34-36, 42 and 54 under 35 U.S.C. 103 (a)

Claims 1-4, 7, 13, 19, 27, 34-36, 42 and 54 are rejected under 35 U. S.C. 103(a) as being unpatentable over Imamura (U. S. Patent 6,801,586) in view of Bingham (U.S. Patent 5, 206, 886).

With respect to claim 1, the Examiner contends that Imamura teaches a method for reducing phase error in a pilot based FDM system, the method comprising compensating pilot sub-carriers within an FDM symbol by an accumulated phase offset.

In view of the Examiner's comments and with a view to better defining the invention, claim 1 has been amended to recite "A method for reducing phase error in a pilot-based, frequency-division-multiplexing (FDM) receiver configured to receive FDM symbols from a remote source, each symbol including a data sub-carrier and a plurality of pilot sub-carriers, the method comprising: simultaneously rotating the plurality of pilot sub-carriers and the data sub-carrier by an accumulated phase offset associated with a carrier frequency offset between the FDM receiver and the remote source ".

Imamura is directed at propagation path estimation and compensation. As known to those skilled in the art, propagation path estimation and compensation is used to account for channel propagation effects upon a signal, such as multipath interference. In addition, Applicant respectfully indicates that propagation path effects are substantially distinct from signal impairments associated with carrier frequency offset. Applicant further contends that Imamura does not disclose nor otherwise suggests transformations of FDM sub-carriers based on an accumulated phase offset associated with a carrier frequency offset between the FDM receiver and the remote source as recited by amended claims 1, 34 and 54, and therefore does not substantially teach nor otherwise disclose the invention of claims 1, 34 and 54.

The Examiner has further relied on Bingham in his rejections of claims 1, 34 and 54.

Bingham discloses a method and apparatus for correcting for clock and carrier frequency offset. The Bingham method comprises two alternate modes: a training mode that uses pilot tones for initializing a correcting signal and a data mode in which the correcting signal previously obtained is used to compensate for impairments in the data and to update an estimate of the phase error. Within the Bingham apparatus of Figure 2, a switch 30 is used to alternate between the two modes, the two modes occurring during non-overlapping time periods.

In contrast, claims 1, 34 and 54 recite "simultaneously rotating the plurality of pilot sub-carriers and the data sub-carrier by an accumulated phase offset." Applicant contends that Bingham does not disclose nor otherwise teach a method or an apparatus allowing simultaneous rotations of the pilot and data sub-carriers by a phase offset. Applicant further contends that modifying the Bingham apparatus to allow for simultaneous rotations of the pilot and data sub-carriers based on a common phase-offset would not be obvious to a person skilled in the art.

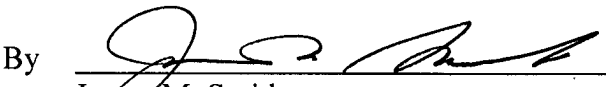
Based on at least this reasoning, Applicant believes that neither Imamura nor Bingham, taken alone or in combination, teach, suggest or make obvious the invention of Claims 1, 34 and 54. Applicant respectfully submits that Claims 1, 34 and 54 are patentable over these references and in condition for allowance and that the remaining claims are also condition for allowance as dependent on allowable base claims.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By 

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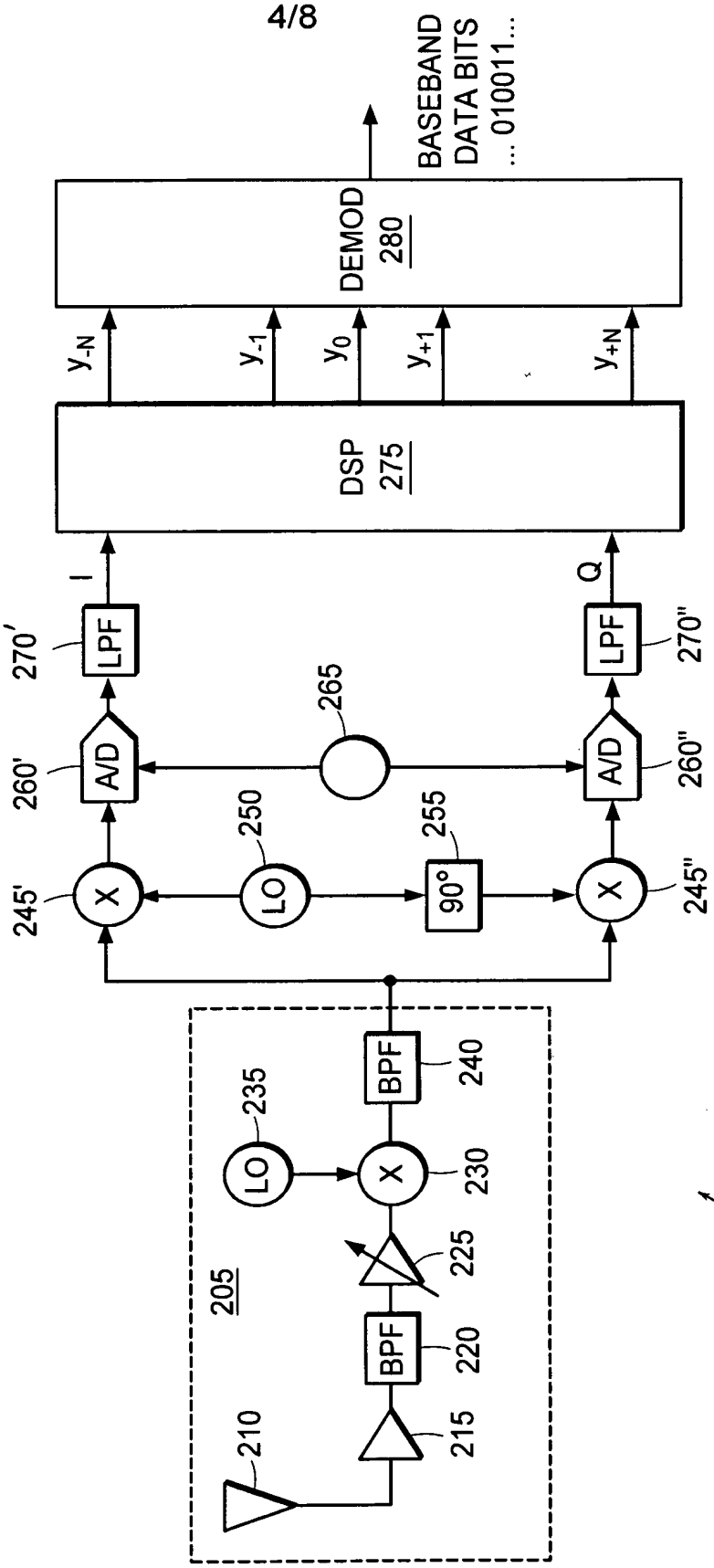

FIG. 4